

REMARKS

Claims 10, 13, and 20 are rejected under 35 U.S.C. 102(e) as being anticipated by Tay U.S. Publication No. 2005/0176833 ("Tay"). Claims 11, 12, and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tay in view of Ingram, U.S. Patent No. 4,035,315 ("Ingram"). Claims 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tay as applied to claim 10, further in view of Fujita et al. U.S. Patent No. 4,405,682 ("Fujita"). Claims 10-16 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujita in view of EP 0 891 860 ("EP '860"). Claims 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujita et al. in view of EP '860 and further in view of Batdorf, U.S. Patent No. 5,786,095 ("Batdorf"). Claims 10-14 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujita in view of Spicuzza, Jr. et al. U.S. Patent No. 4,168,347 ("Spicuzza"). Claims 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujita in view of Spicuzza and further in view of Batdorf. Claims 10, 13 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cook U.S. Patent No. 4,015,386 ("Cook") in view of EP '860. Claims 11, 12 and 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cook in view of EP '860 and further in view of Fujita. Claims 10-14 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cook in view of Vonken et al. U.S. Patent No. 5,470,888 ("Vonken"). The applicant respectfully traverses these rejections.

Rejection under 35 USC § 102

Claims 10, 13, and 20 are rejected under 35 U.S.C. 102(e) as being anticipated by Tay
The present Invention is distinct over Tay by the fire-protection layer, which has been introduced between the thermally insulating core material and the metal sheet (see independent claim 10).

Tay discloses a sandwich panel, where the fire resistant material is inside the foam core. Two alternatives for incorporating the flame resistant material into the core material are suggested. Either the core is build by particles, wherein each particle is coated with the fire resistant material and bonded together with a binder or internal surfaces of open celled foam are coated with the fire resistant material (see paragraphs [0023] and [0030] of Tay). Tay does not disclose a fire resistant layer between the core material and the facing sheets (metal sheets).

In contrast hereto the thermally insulating core material according to claim 10 of the present invention is composed of molded polystyrene foam. The core material has totally different properties, since the foam particles are not coated and not bound together with a binder. This has the advantage of low density and long-lasting insulation properties (see specification on page 2, lines 7 to 10). For the above reasons, this rejection should be withdrawn.

Rejection Over Tay in View of Ingram

Claims 11, 12, and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tay in view of Ingram. Tay is discussed above. Ingram discloses fire-resistant foams which are prepared by coating styrene polymer foam particles with an intumescent paint and molding the coated particles (see the abstract). According to the Examples the density of foam is more than doubled (2.2 pcf) compared to the uncoated foam particles ($1 \text{ pcf} = 16 \text{ kg/m}^3$). The applicant has informed the undersigned that the foam particles are mainly bound by the binder of the paint and only to a low amount by fusion. The process is similar to the process according to Tay and the resulting properties of the foam core would be different, as explained above. For the above reasons, this rejection should be withdrawn.

Rejection of Claims 15 and 16 over Tay and Fujita

Claims 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tay as applied to claim 10, further in view of Fujita. Fujita discloses a fire-resistant, thermally insulating board, which comprised rigid isocyanurate foam (F) as core material (see the abstract). There appears to be no other foams mentioned in Fujita. Fujita does not mention polystyrene foams as is claimed by the applicant. A person of ordinary skill in the art would not combine Fujita with Tay, since the core materials are totally different. The rigid isocyanurate foams of Fujita are thermosetting foams, which are made by the reaction of an organic polyisocyanate and a polyol compound in the presence of blowing agents (Col 4, lines 24 to 29), whereas the foams according to Tay are made by bonding coated particles together by a binder. Therefore, these references are not combinable. For the above reasons, this rejection should be withdrawn.

Rejection of Claims 10-16 and 20 over Fujita in View of EP '860

Claims 10-16 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujita in view of EP '860. The Examiner correctly states, that Fujita does not disclose the foam core made from a polystyrene foam.

EP '860 provides a fire-resistant composite panel comprising a core of rigid foamed plastics material, which is bonded to a metal outer layer over part of the panel, wherein the layer of intumescent mat is interposed between the core and the metal layer (see the abstract and Claim 1). A person of ordinary skill in the art would not combine Fujita with EP '860, since the intumescent mat is preferably a graphite based mineral fibre stabilized material (Col 2, lines 6 to 7), which is totally different to the sodium silicate layer.

Even if the person skilled in the art would combine these references, he would properly change the intumescent layer and not the foam core. According to EP '860 the intumescent sheet is regularly perforated with holes that are sufficiently large to allow the flowing foam to adhere to the metal sheets through these holes (Col. 2, lines 20 to 25). The applicant has informed the undersigned that it cannot work when using thermoplastic polystyrene foams instead of thermosetting foams, such as polyurethane or polyisocyanurate. If starting from a polystyrene foam, an alternative manufacturing process is used that starts with sheet sprayed on one side with a liquid adhesive, which can pass through the perforations, then pressed against the slab with the intumescent sheet sandwiched in between (Col. 3, lines 21 to 28). **EP '860 clearly shows, that a thermosetting foam can not easily be exchanged by a thermoplastic foam without modifying process conditions.**

Because of the thermoplastic nature, in case of a fire the particulate polystyrene foam melts because of the high heat above the glass transition temperature of polystyrene. The mechanical stability of a sandwich panel will be destroyed (see the applicant's specification on page 1, second paragraph). The person skilled in the art would not have predicted that also a thermoplastic foam core could be protected by a fire-retardant layer according to claim 1 and that the structural integrity of the panel may be maintained during exposure to fire for a certain period of time (example 1). Therefore it was not obvious to the person skilled in the art to replace the polyisocyanurate foam with a polystyrene foam.

Because of the difference of the materials used for the intumescent layer and also the different application to the foam and the metal layer, the person of ordinary skill in the art would not know, if the thickness of the intumescent layer should be the same. For the above reasons, this rejection should be withdrawn.

Rejection Of Claims 15 And 16 And 20 Over Fujita In View Of EP '860 And Batdorf

Claims 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujita et al. in view of EP '860 and further in view of Batdorf.

As explained above, there is no motivation for the person skilled in the art to combine Fujita with EP '860. Therefore there is no motivation to combine all three of these references.

Batdorf discloses an intumescent thermal barrier composition and its application to various substrates (see the abstract and col. 1, lines 5-10). Batdorf does not disclose a specific substrate nor a composite comprising two metal sheets with molded polystyrene foam as core. Batdorf does not indicate if the thickness of the coating is also sufficient for polystyrene foam cores. For the above reasons, this rejection should be withdrawn.

Rejection of Claims 10-14 and 20 over Fujita in view of Spicuzza

Claims 10-14 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujita in view of Spicuzza. As stated above, the Examiner correctly states that Fujita does not disclose the foam core made from a polystyrene foam. As stated above, the person skilled in the art has no motivation to replace the polyisocyanurate foam in the composite of Fujita with a polystyrene foam.

Spicuzza is directed to a specific intumescent composition containing the reaction product of phosphoric acid and a reducing sugar (Claim 1). The person of ordinary skill in the art would not combine Fujita with Spicuzza, because the intumescent material is totally different to the sodium silicate layer of Fujita.

Furthermore according to the teaching of Spicuzza a specific process step c), wherein the article has to be subjected to the passage of electric waves of high frequency alternating current (microwave) is necessary. Otherwise the samples show signs of disassociation upon exposure to humidity (see Example II Sample A compared to Sample B). This would not motivate the person of ordinary skill in the art to modify the thermally insulating board of Fujita by any feature of Spicuzza. For the above reasons, this rejection should be withdrawn.

Rejection of Claims 15 and 16 over Fujita in view of Spicuzza and Batdorf

Claims 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujita in view of Spicuzza and further in view of Batdorf. The applicant discussed all three of these references above. As stated above, the person skilled in the art has no motivation to replace the polyisocyanurate foam in the composite of Fujita with a polystyrene foam. As stated above, the applicant does not believe that Spicuzza and Batdorf are combinable with Fujita. For the above reasons, this rejection should be withdrawn.

Rejection of Claims 10, 13 and 20 over Cook in view of EP '860

Claims 10, 13 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cook in view of EP '860. The Examiner at page 8 of the Office Action acknowledges that Cook does not specifically disclose the foam core made from a polystyrene foam.

For the manufacture of fire-retardant insulating panel according to Cook, polyurethane or other polymeric foam resin is filled in a sheet metal casing (Col 3, lines 4 to 10). Since, the liquid constituents of the foam resin are introduced into the hollow interior through suitable openings in the casing wall, the person skilled in the art would never consider a polystyrene foam as substitute for the polyurethane foam core.

Regarding the combination with EP '880 the same argumentation as above would apply.

For the above reasons, this rejection should be withdrawn.

Rejection of Claims 11, 12 and 14-16 over Cook in view of EP '860 and Fujita

Claims 11, 12 and 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cook in view of EP '860 and further in view of Fujita. All three of these references were discussed above. Cook and Fujita do not disclose the use of polystyrene foam. As stated above, the applicant does not believe that EP '860 is combinable with these references. For the above reasons, this rejection should be withdrawn.

Rejection of Claims 10-14 and 20 over Cook in view of Vonken

Claims 10-14 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cook in view of Vonken. As stated above, Cook does not teach the use of polystyrene foam.

Vonken does not relate to a fire and heat resistant structure, but to polystyrene foam containing unspecified flame proofing agents. A specific burning test is passed after shorter storage time due to the blowing agent (Col. 3, lines 15 to 20). Vonken does not mention any composite structure with metal sheets nor any intumescent layers, which foam on exposure to high temperatures protecting the core material from the heat of the fire (see the applicant's specification on page 2, lines 26 to 29).

As stated above, there is no indication, why a person of ordinary skill in the art would substitute the foam core of Cook by a polystyrene foam according to Vonken. For the above reasons, this rejection should be withdrawn.

In view of the above response, applicant believes the pending application is in condition for allowance.

A one month extension has been paid. Applicant believes no additional fee is due with this response. However, if a fee is due, please charge our Deposit Account No. 03-2775, under Order No. 12810-00344-US from which the undersigned is authorized to draw.

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Respectfully submitted,

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